Studies on the Renal and Cardiovascular Effects of Electromagnetic Field Exposure in Rats

Thesis
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بسم الله الرحمن الرحيم

يرفع الله الذين آمنوا منكم و الذين أوتوا العلم درجات والله بما تعملون خبير*

صدق الله العظيم

الآية رقم (١١) سورة المجادلة

To My Family

دراسة تأثير التعرض للموجات الكهرومغناطيسية على وظائف الكلي والجهاز الدوري في الفئران

رسالة مقدمة من

الطبيبة/ نهى نوح لاشين

المدرس المساعد بقسم الفسيولوچى

توطئة للحصول على درجة الدكتوراة في العلوم الطبية الأساسية
(الفسيولوچيا)

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ABP: Arterial Blood Pressure.

ACTH: Adreno-Corticotropic Hormone.

ADA: Adenine Deaminase.

ADHD: Attention Deficit Hyperactivity Disorder.

BUN: Blood Urea Nitrogen.

CAPE: Caffeic Acid Phenethyl Ester.

CAT: Catalase.

EHS: Electromagnetic Hypersensitivity.

ELF: Extremely Low Frequency.

ELFMF: Extremely Low Frequency Magnetic Fields.

EMFs: Electromagnetic Fields.

EMR: Electromagnetic Radiation.

GH: Growth Hormone.

GSH: Glutathione reduced.

GSH-Px: Glutathione Peroxidase.

GSM: Global System for Mobile Communication.

HR: Heart Rate.

HRV: Heart Rate Variability.

IEI-EMF: Idiopathic Environmental Intolerance with Attribution to Electromagnetic Fields.

MDA: Malondialdehyde.

NAG: N-acetyl- beta-d- glucosaminidase.

NO: Nitric Oxide.

PRA: Plasma Renin Activity.

RF: Radiofrequency.

RF/MW: Radiofrequency Microwave.

RF-EMR: Radiofrequency Electromagnetic Radiation.

RF-EMWs: Radiofrequency Electromagnetic waves.

RFFs: Radiofrequency Fields.

RFR: Radiofrequency Radiation.

RIA: Radioimmunoassay.

ROS: Reactive Oxygen Species.

SAR: Specific Absorption Rate.

SMF: Static Magnetic Field.

SOD: Superoxide Dismutase.

T_3: Triiodothronine.

T_4: Thyroxin.

TBA: Thiobarbituric Acid.

TCAA: Tricholoroacetic acid.

TSH: Thyroid Stimulating Hormone.

UV: Ultra Violet.

W/Kg: Watt per Kilogram.

XO: Xanthine Oxidase.

Introduction

The use of cell phones is currently one of the fastest growing technological developments, and, together with the increasing number of associated base stations, have become a widespread source of non-ionizing electromagnetic radiation (EMR) **(Oktem et al., 2005)**. **Ozguner et al. (2005$_{a,b,c,d,e}$)** stated that electromagnetic fields (EMFs) are a documented form of stress, and could possibly, therefore, have detrimental health effects. Further, **Yurekli et al. (2006)** reported that some biological effects were likely to occur even at low-level EMF.

Bortkiewicz (2001) had proposed that the growing number of cell phone users and numbers of inhabitants living in the vicinity of base stations would raise the interest in studying the effects of emitted electromagnetic fields on living organisms.

Health endpoints reported to be associated with extremely low frequency and/or radiofrequency include childhood leukaemia, brain tumors, genotoxic effects, neurological effects and neurodegenerative diseases, immune system deregulation, allergic and inflammatory